

Inside Wallops

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NASA Know-How Helps Athletes Rocket Through Water

When a swimsuit manufacturer wanted to create a better fabric for competitive swimmers, it sought out some unlikely experts — aerospace engineers at NASA's Langley Research Center.

NASA has decades of experience in fluid dynamics and drag reduction. However, aerospace engineers usually concentrate on the element through which airplanes and spacecraft fly, not the liquid through which swimmers travel. Still, some of the science is similar.

"Air and water are both what are referred to as Newtonian fluids," said Steve Wilkinson, a researcher at Langley's Fluid Physics and Control Branch. "Air has different fluid properties than water, including lower density and viscosity, but it still obeys the same physical laws of motion."

That fact led Warnaco Inc. of New York, the U.S. licensee of the Speedo swimwear brand, to seek use of a NASA wind tunnel at Langley to test swimsuit fabrics that may be used by athletes in international competitions.



"We evaluated the surface roughness effects of nearly 60 fabrics or patterns in our small low-speed tunnel, which is perfect for this purpose," Wilkinson said. "We were assessing which fabrics and weaves had the lowest drag."

Reducing drag helps planes fly more efficiently, and reducing drag helps swimmers go faster.

Studies indicate viscous drag, or skin friction, is about one-third of the total restraining force on a swimmer.

Wind tunnel tests measure the drag on the surface of the fabrics.

Wilkinson and other NASA researchers usually spend their time studying drag reduction for airplanes.

They even have worked on drag reduction technology for boats, including an America's Cup winner in the 1980s. This expertise is one reason Speedo chose to work with NASA.

"This is the first time I've tested a fabric and there were some challenges involved," said Wilkinson. "I think we've done a really good job with the help of Speedo in coming up with a protocol that enables us to test these fabrics with ease and precision."

The materials tested come in the form of tubes. Wilkinson stretches the tubes over a smooth, flat aluminum plate and then secures the edges with smooth metal rails and tape to form a precise rectangular model shape. Wilkinson runs the material through a number of wind speeds and, with the help of sensors, measures drag on the surface.

Under a reimbursable agreement, NASA turns the wind tunnel data over to Speedo for their use.

"It turns out to simulate a swimmer in the water at about two meters per second, we need to run the wind tunnel at about 28 meters per second, which is well within its capability," Wilkinson added. "The tests generally have shown the smoother the fabric, the lower the drag."

Speedo International's research and development team, Aqualab, took those results and used them to help create a new swimsuit the company says is its most hydro-dynamically advanced to date.

Words to Live by

"There are no shortcuts to any place worth going"..... Beverly Sills



NASA Scholarships Available

NASA has announced a new aeronautics scholarship opportunity, NASA's Aeronautics Scholarship Program.

Work conducted at NASA's Aeronautics Research Mission Directorate is directed toward enhancing the state of aeronautics for the nation, transforming the nation's air transportation system, and developing the knowledge, tools, and technologies to support future air and space vehicles.

The application deadline is March 17. For further information visit: <http://www.asee.org/fellowships/nasaasp>

In addition, the call for the NASA College Scholarship Fund (NCSF) is out. Six scholarship recipients will be selected and receive a scholarship allocation of \$10,000.

NCSF applications are due March 20. For more information contact Goddard's NCSF point-of-contact, Susan Rambo at x66-7205, or visit:

<http://nasapeople.nasa.gov/nasascholarship/index.htm>

Powered by NASA

NASA drives innovation, creating real benefits for a modest investment.

One example is the Water Security Company of Sparks, Nev., known for its commercialization of the Microbial Check Valve technology dedicated to providing solutions to the world's most challenging water quality problems.

Originally developed by NASA's Marshall Space Flight Center to convert waste water into potable water for astronauts on the space shuttle and the International Space Station. This technology now is used in rural areas of the United States and in developing countries around the world to draw drinkable water.

For further information visit the Deputy's Corner at: <http://insidenasa.nasa.gov/portal/site/insidenasa>

Environmental Functional Review, March 24 - 27

Every 3 years, NASA Headquarters (HQ) performs an Environmental Functional Review (EFR) to ensure that all Centers are properly managing the Agency's environmental liabilities, including regulatory requirements.

Individuals who supervise, manage, or operate areas will be involved in the review. The Headquarters team consists of nine inspectors. The Wallops Environmental Office will be contacting individuals who work closely in the areas to be reviewed to answer any questions or concerns. The review will cover the following areas:

1. Air Emissions Management
2. Cultural Resources Management
3. Hazardous Materials Management
4. Hazardous Waste Management
5. National Resource Management
6. NEPA, Pollution Prevention, Noise
7. Pesticide Management
8. Petroleum, Oil and Lubricant Management
9. Solid Waste Management
10. Storage Tank Management
11. Toxic Substances Management
12. Wastewater Management
13. Water Quality Management
14. Environmental Management Systems (EMS)
15. Energy and Water Conservation



Organizations that can expect to be visited by the EFR team are those that:

- Use and store hazardous materials - maintain available Material Safety Data Sheets (MSDS)
- Dispose of hazardous waste
- Have satellite accumulation areas for hazardous waste
- Release regulated air emissions including operations with paint booths, generators, boilers, solvents, any sized containers of volatile organic compounds (VOCs) and materials and equipment that contain VOCs
- Maintain petroleum and chemical storage tanks
- Impact wetlands, storm water, sediment, erosion, and cultural resources
- Emit ozone depleting substances and hazardous air pollutants
- Purchase or request supplies, materials, and equipment (affirmative procurement)
- Manage emergency preparedness

The following examples are provided to assist all employees in correcting recurring problems in preparation for the EFR.

- o Missing or incomplete records
- o Hazardous waste in trash cans or dumpsters
- o Recyclable materials in trash cans and dumpsters (cardboard, etc.)
- o Open containers of VOCs
- o MSDSs information unavailable for employees or not current
- o Unlabeled, mislabeled, or improperly labeled hazardous waste and hazardous materials containers
- o Fluorescent tubes and bulbs in trash
- o Lead solder in trash
- o Incompatible chemicals stored together
- o Wipes, rags, swabs that contain solvents in open containers
- o Waivers not processed for affirmative procurement
- o New employees who have not been hazcom trained
- o Parts washer with open lids when not used
- o Drum lids/bungs that are not wrench tightened
- o Random dumping of materials on the Facility
- o Compressed gas cylinders without safety caps or improperly chained



The EFR can be somewhat disruptive to normal operations, but an attempt will be made to minimize any inconvenience. Ensure that there is access to all areas.

For additional information or assistance, contact Bonnie Crawford at x2234.

Thank You Wallops Employees

WICC and WEMA collected 76 of your old cell phones between November and January for Cell Phones for Life, Inc., a non-profit organization that reconditions the phones and donates them to the elderly, the disabled, and the women in battered women's shelters for emergency use.



To learn more about this organization visit www.cellphonesforlife.org

Locker Assignments in the Wallops Gym

Wallops Fitness Club members that would like to keep their assigned lockers should contact Roland Wescott at x1624 as soon as possible to confirm their status.

Any individual that has a lock on a gym locker and does not have a current Fitness Club key card are asked to remove the locks and contents no later than March 6.

On March 7 all lockers that have not been confirmed will have locks cut and the contents removed.

Contact Robert Tittle, x1244; Roland Wescott, x 1624; John Gerlach, x1515; or the Exchange Store, x2020 for new key cards.

*Daylight Saving Time
Begins At 2 a.m.,
Sunday, March 9.
Set clocks ahead 1
hour.*



"Generational Differences in Communications"

March 6
11:30 a.m. – 12:30 p.m.
Building E-2
Williamsburg Room



Bring your lunch and your questions and join us for this Lunch & Lean presented by the Employee Assistance Program.

Inside Wallops is an official publication of Goddard Space Flight Center and is published by the Wallops Office of Public Affairs, Extension 1584, in the interest of Wallops employees. Recent and past issues of *Inside Wallops* also may be found at: <http://www.nasa.gov/centers/wallops/news/newsletters.html>

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